

REMARKS

This amendment responds to the office action mailed on September 13, 2004. In the office action the Examiner:

- rejected claims 126-160 under a non-statutory double patenting rejection based on Zerbe et al. (US 6,396,329);
- rejected claims 126-140 and 142-160 under 35 U.S.C. 102(b) as anticipated by Hui (US 5,793,816);
- objected to the acronyms PAM, MSB and LSB being used in the claims without being defined the first time they appear in the claims; and
- indicated that claim 141 constituted allowable subject matter and objected to this claim as depending from a rejected base claim.

After entry of this amendment, the pending claims are: claims 126-160.

Claims 113-125 and 161-171 were previously withdrawn in response to a restriction requirement. Claims 1-112 were previously canceled.

Overview of Changes to Claims

Claims 126 and 142 have been amended to indicate the meaning of the acronym PAM. Support is found in the specification on p. 10, line 6. The amendment, therefore, does not constitute new matter.

Objection

The acronym PAM has been defined in independent claims 126 and 142. The acronyms MSB and LSB are already defined in their first occurrence in the pending claims, specifically, claim 133. Removal of this ground for objection is requested.

Double Patenting

Claims 1-42 in US Patent 6,396,329 (Zerbe) do not contain every element of pending claims 126-160. In particular, claims 1-42 in Zerbe do not include the limitations of multiple operating modes, each operating mode corresponding to a different multi-level pulse amplitude modulation (see the discussion of the 35 USC 102(b) rejection below). Claims 1-42 in Zerbe are directed towards particular circuit limitations, such as a preamplifier, sense amplifier and an integrator, that are not present in pending claims 126-160. As such, the

pending claims are patentably distinct and non-obvious from the claims in Zerbe.

Reconsideration of the double patenting rejection is requested.

35 USC 102(b) Rejection

Hui discloses transmitting and receiving data between two integrated circuits using differential signals (col. 5, lines 63-65) on at least two signal lines. The differential signals are encoded using 4-level pulse amplitude modulation (4-PAM) (col. 1, lines 51-52, col. 3, lines 3-4 and Fig. 2). In 4-PAM, two data bits are mapped to one of four voltage levels (which may be single ended or differential voltage signals). See the driver outputs and receiver inputs in col. 3, Tables A and B, respectively. Hui neither discloses nor teaches the use of multiple modes of operation, each mode of operation using a different pulse amplitude modulation, say, 4-PAM in one mode of operation and 8-PAM in another mode of operation.

Note that for a given pulse amplitude modulation, such as 4-PAM, given data bits will be mapped to a particular voltage level (which may be a single ended or differential voltage level) out of a set of allowed voltage levels. In this case of 4-PAM, there are four voltage levels (see, for example, Fig. 2 in Hui). The Examiner's statement in the Office Action that Hui operates in a specified mode of a plurality of predefined modes (p. 4, lines 8-9) is incorrect. Hui outputs voltage levels selected from a set of four voltages levels, which constitutes one mode of operation, specifically, 4-PAM. The Examiner admits this in the Office Action: "input Y is assigned to 1 of 4 levels" (p. 4, lines 11-12 and lines 14-15). Different modes of operation entail the mapping of data bits to a different number of voltage levels selected from different sets of voltage levels.

Independent claim 126 in the present application contains the limitations of:

wherein the multi-mode PAM receiver is capable of operating in a specified mode of a plurality of predefined modes;

wherein the received symbol is an N-PAM symbol when the specified mode is a first mode;

wherein the received symbol is an M-PAM symbol when the specified mode is a second mode; and

wherein N is not equal to M.

Independent claim 142 contains the limitations of:

wherein the first stream of signals includes an N-PAM modulated symbol when a mode signal is in a first mode signal state;

wherein the first stream of signals includes an M-PAM modulated symbol when the mode signal is in a second mode signal state; and

where N is not equal to M.

Therefore, both independent claims include the limitations of multiple modes of operation, each mode corresponding to a multi-level pulse amplitude modulation having a different number of levels (M-PAM and N-PAM, respectively). Such different modes of operation entail the mapping of data bits to a different number of (single ended or differential) voltage levels. For example, 4-PAM in one mode of operation and 8-PAM in another mode of operation. Hui does not contain all of the limitations of these independent claims and, therefore, does not anticipate these claims. Since the dependent claims contain the limitations of their parent independent claims, the dependent claims are also not anticipated by Hui. Removal of this ground for rejection is requested.

In light of the above amendments and remarks, the Applicant respectfully requests that the Examiner reconsider this application with a view towards allowance of all of the pending claims. The Examiner is invited to call the undersigned attorney at (650) 843-7501, if a telephone call could help resolve any remaining items.

Respectfully submitted,

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